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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/821,415	03/28/2001	Yehiel Gotkis	LAM2P246	3672
25920	7590	12/30/2003	EXAMINER	
MARTINE & PENILLA, LLP 710 LAKEWAY DRIVE SUITE 170 SUNNYVALE, CA 94085			VU, HUNG K	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 12/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/821,415

Applicant(s)

GOTKIS ET AL.

Examiner

Hung K. Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6-8 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-8 and 26-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-8 and 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi (PN 6,333,255, of record) in view of Ahn et al. (PN 6,277,728, of record).

Sekiguchi discloses, as shown in Figures 4(c) and 5(c), a semiconductor device comprising,

a substrate (1) having transistor devices [Col. 12, lines 55-61];

a plurality of copper interconnect metallization lines and conductive vias (17, two outside lines) defined in each of a plurality of interconnect levels of the semiconductor device, the plurality of copper interconnect metallization lines and conductive vias being isolated from each other by a low-k dielectric material [Col. 12, lines 61-65, Col. 13, lines 24-39, and Col. 17, lines 1-10];

a plurality of supporting stubs (17, two inside lines), each of the plurality of supporting stubs configured to form a supporting column that extends through the plurality of interconnect levels of the semiconductor device. Note that it is inherent that the two inside lines provide support structure.

Sekiguchi does not disclose the low-k dielectric material is a porous dielectric material.

However, Ahn et al. discloses the plurality of copper interconnect metallization lines and

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conductive vias (48,54,70) isolated from each other by low-k dielectric material (56) including a porous dielectric material. Note Figures 1-12 and Table of Ahn et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the low-k dielectric material of Sekiguchi by a porous dielectric material, such as taught by Ahn et al. because a porous dielectric material is commonly used as the interlayer dielectric material and it helps to reduce the coupling capacitance between the interconnects.

With regard to claims 7 and 30, Sekiguchi and Ahn et al. disclose the plurality of supporting stubs is not electrically interconnected to the plurality of copper interconnect metallization lines and conductive vias [see Figures 4(c) and 5(c)].

With regard to claims 8 and 31, Sekiguchi and Ahn et al. disclose the device further comprising a passivation (19b) defined over a topmost layer of the copper interconnect metallization lines and conductive vias [see Figures 4(c) and 5(c)].

With regard to claims 26 and 32, Sekiguchi and Ahn et al. disclose the plurality of copper interconnect metallization lines and conductive vias define dual damascene structures [see Figures 4(c) and 5(c)].

With regard to claims 27 and 33, Sekiguchi and Ahn et al. disclose the plurality of supporting stubs further support a passivation layer (19b) [see Figures 4(c) and 5(c)].

***Response to Arguments***

2. Applicant's arguments filed 09/26/03 have been fully considered but they are not persuasive.

It is argued, at page 8 of the Remarks, that the two inside lines of Figures 4(c) and 5(c) of Sekiguchi are just wires used to provide connection between the multiple levels of the semiconductor structure and they are not provide support for the structure. This argument is not convincing because, in addition to provide connection between the multiple levels of the semiconductor structure, the two inside lines also provide support for the structure. Note that the claimed language does not specifically state whether the lines are the dummy lines or not connect to any circuit element.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., using the porous dielectric material without the SiO<sub>2</sub> layers) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

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It is argued, at page 9 of the Remarks, that neither Sekiguchi nor Ahn et al. teaches or suggests adding a passivation layer to the semiconductor device, as defined in claim 34. This argument is not convincing because Sekiguchi and Ahn et al. teach a passivation layer (19b) to the semiconductor device. Note Figures 4(c) and 5(c) of Sekiguchi.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, Sekiguchi does not disclose the low-k dielectric material is a porous dielectric material. Ahn et al. discloses the plurality of copper interconnect metallization lines and conductive vias (48,54,70) isolated from each other by low-k dielectric material (56) including a porous dielectric material. Therefore, one of ordinary skill in the art would be motivated to substitute the low-k dielectric material of Sekiguchi with a porous dielectric material, such as taught by Ahn et al. since a porous dielectric material is commonly used as the interlayer dielectric material and it helps to reduce the coupling capacitance between the interconnects.

### ***Conclusion***

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

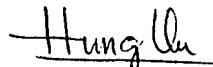
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

December 18, 2003



Hung Vu

Patent Examiner